

**WISCONSIN PER CAPITA PERSONAL INCOME:  
ANALYSIS OF TRENDS AND FACTORS  
CONTRIBUTING TO ITS GROWTH**

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## **WISCONSIN PER CAPITA PERSONAL INCOME - ANALYSIS OF TRENDS AND FACTORS CONTRIBUTING TO ITS GROWTH**

### **EXECUTIVE SUMMARY**

This report provides a detailed analysis of trends in regional and Wisconsin per capita income, and discusses the primary factors contributing to Wisconsin's per capita income growth. The analysis segregates personal income into its major components such as wages and salaries, proprietors' income, and transfer payments, and examines the changing industry mix in Wisconsin and personal income growth in metro and non-metro areas.

The first part of the study discusses long-term trends in Wisconsin's personal per capita income and compares it to national and regional trends. There is a theoretical basis for long-term convergence of growth in per capita incomes across regions and states. The study finds that between 1929 and 1999, regional per capita incomes have converged to the U.S. average, but there is somewhat weaker evidence for convergence across states. During the period of study, Wisconsin's per capita income has remained below the U.S. average, with the exception of the periods of 1950-53 and 1978-81, and has remained below the Great Lakes Region average capita income during the entire period.

The second part of the study focuses on trends in the major components of per capita personal income in Wisconsin relative to national trends. The analysis reveals that relative per capita personal income has declined in Wisconsin and was influenced by a cyclical pattern in per capita wage and salary income and a long-term downward trend in proprietors' income per capita. Furthermore, the analysis reveals that one major reason for a lower per capita personal income relative to the U.S. has been a decline in the relative average wage per job in Wisconsin. The negative impact of a declining relative wage per job on per capita income has been tempered by an increasing ratio of jobs per person.

The third part of the study continues to focus on the phenomenon of declining relative wage rates by looking at how a changing industry mix influences relative wages and ultimately Wisconsin's per capita income. The analysis reveals that the decline in Wisconsin average wage rates relative to the U.S. has not been limited to a few industry groups, but rather has occurred in all major industry groups. Furthermore, the impact of a changing industry mix has been to lower Wisconsin's relative wage and is in large measure due to the relatively rapid employment growth in lower wage industries, and a concentration of Wisconsin manufacturing employment in relatively lower paying production jobs.

The fourth and final part of the study investigates whether the distinction between metropolitan and non-metropolitan measures of per capita income might shed some light on the lower than average Wisconsin per capita personal income. The analysis shows that part of the difference between Wisconsin per capita income and U.S. per capita income can be explained by a higher proportion of Wisconsin's population living in non-metropolitan areas, where wage rates are lower than in metropolitan areas. Furthermore, the analysis also finds that per capita income in metropolitan areas is significantly associated with population size. Wisconsin's metro areas are mostly small in population size, and that fact explains a significant part of the Wisconsin-U.S. per capita income gap.

# **WISCONSIN PER CAPITA PERSONAL INCOME - ANALYSIS OF TRENDS AND FACTORS CONTRIBUTING TO ITS GROWTH**

## **INTRODUCTION**

Personal income per capita is a measure that is widely accepted among economists and policy analysts as an indicator of economic well-being of residents of a country or a state. The level of per capita personal income can be used as a broad gauge for measuring the relative economic performance of two or more regions or states. Also, growth in relative per capita personal income is used as evidence that regions and states are becoming more or less wealthy, as compared to a national or regional benchmark.

State and local policymakers have recognized the usefulness of per capita income measures in formulating and evaluating various policy proposals. For example, Wisconsin policymakers have in the past called for establishing a link between growth in state and local government spending and growth in personal income.<sup>1</sup> Recently, Governor Scott McCallum and legislators advanced a proposal to link general-purpose revenue growth in any biennium to the average annual percentage change in state aggregate personal income.<sup>2</sup> It has also been noted, in the context of assessing Wisconsin's ability to pay for government services, that Wisconsin per capita personal income has been "*chronically below national levels*".<sup>2</sup>

Since policymakers are interested in using per capita income growth as an indicator to guide broadly defined policy measures, it is important to determine which factors are most likely to influence growth in per capita income. Such an analysis should also indicate whether these factors influence short-term or long-term growth, and whether they are amenable to state or local policy initiatives.

The paper is divided into four-parts: Part I examines whether there is a long-term trend toward convergence of per capita personal income; Part II analyses personal income composition to try to explain Wisconsin-U.S. income differences; Part III looks at the changing industry mix and relative wage growth while Part IV analyzes per capita personal income by metropolitan and non-metropolitan areas.

## **I. PER CAPITA PERSONAL INCOME IN WISCONSIN - IS THERE A LONG-TERM TREND TOWARD CONVERGENCE?**

This section takes a look at long term trends in regional and Wisconsin per capita income growth. First, long-term trends in per capita income for major U.S. regions as defined by the Bureau of Economic Analysis (BEA), between 1929 and 1999 are discussed. The data show that during most of this time there has been a consistent long-term convergence of regional per capita incomes toward the U.S. average. Second, long-term trends in per capita income for Wisconsin and the Great Lakes Region are outlined. The data for Wisconsin shows that for most of the 20th century, per capita income remained below the U.S. and the Great Lakes average. However, the gap between the per capita Great Lakes income and Wisconsin's income has been reduced over time. Beginning in the early 1980s, Wisconsin's per capita income diverged from the U.S. average. During the last ten years it has begun to converge again, reaching the level of about 96% of the U.S. average in 1995 and remaining at this level.

### **Background Theory and Literature Review**

Neoclassical economic theory proposes that much of long-term growth is determined by automatic forces of convergence, defined in general as the tendency for poorer economies to grow faster than richer economies.<sup>3</sup> The standard neoclassical growth model assumes that the factors governing growth are exogenous, or determined by demographic and technological factors not subject to policy influence. Policy may affect short-term growth rates, but given the same resources and access to technology and mobile inputs of production for all regions and states, economies should converge over time to a common long-run steady-state growth rate.

Some researchers have noted that the standard neoclassical growth model fails to reconcile observed differences in per capita incomes across regions and over time.<sup>4</sup> Newer theories of growth incorporate endogenous growth models, which allow for growth to be influenced by factors internal to the region's economy. For example, increasing returns to physical capital or externalities associated with human capital, such as the beneficial impacts of a major research university like the University of Wisconsin, may induce growth. Essentially, if growth factors are endogenous, shocks, including policy changes, may influence demographic and technological variables, and economies need not converge. Factors unique to an industry or geography may be enough to interrupt long-term trends towards convergence.

Despite a large body of research, it is not clear whether or not less-developed regions, with lower per capita income, are converging over time to richer regions, with a higher per capita income—commonly defined as the "convergence hypothesis".

The first group of studies consists of descriptive analyses of economic convergence among regions. In their seminal article, Kris Mitchener and Ian McLean investigate the U.S. regional long-term growth covering the period from 1880 to 1980, building on a pioneering work of Richard Easterlin,<sup>5</sup> who compiled estimates of personal income since the mid-19th century. They identify regional price levels as relevant in explaining changes in regional per capita income and draw attention to demographic and labor characteristics in accounting for regional growth and convergence. Other researchers point to additional factors responsible for convergence among regions such as: initial factor endowment,<sup>6</sup> demographics, education and labor markets,<sup>7</sup> and industrial mix and relative wage levels.<sup>8</sup>

The second group of studies encompasses more detailed empirical investigations of regional convergence. Foremost among this group are studies by Barro and Sala-i-Martin,<sup>9</sup> who define two measures of economic convergence: beta and sigma convergence. Beta convergence is defined as

the process in which poorer areas, with a relatively lower per capita income, tend to grow at a faster rate than rich areas, with a higher relative per capita income. The notion of sigma convergence implies that the dispersion of regional per capita income falls over time, as the economic homogenization of areas takes place.

In their study of economic growth and convergence among the U.S. states, they conclude that the per capita income in U.S. states tends to converge at a rate of about 2% per year. This rate was found to be stable over time assuming that a measure of structural shocks is held constant. The study also shows the evidence of sigma convergence, as the dispersion in states' per capita income has declined over time.

### Long Term Convergence In U.S. Regions

Over the last 70 years there appears to be a long-term trend of convergence in per capita regional incomes toward the U.S. average, as shown on [Chart I.1](#). High-income regions, where the per capita income has generally exceeded the U.S. average, have converged toward the U.S. average from above; these include Mideast, New England, Far West and Great Lakes. In the low-income regions, per capita income has tended to rise toward the U.S. average from below, such as in the Southeast, Southwest, Plains, and Rocky Mountain regions. ([Table I.1](#) lists the states in each region, as defined by the Bureau of Economic Analysis.)

TABLE I.1  
BEA REGIONS

New England Region	Plains Region	Great Lakes Region	Rocky Mountain
Connecticut Maine Massachusetts New Hampshire Rhode Island Vermont	Iowa Kansas Minnesota Missouri Nebraska North Dakota South Dakota	Illinois Indiana Michigan Ohio Wisconsin	Colorado Idaho Montana Utah Wyoming
Mideast Region	Southeast Region	Southwest Region	Far West Region
Delaware District of Columbia Maryland New Jersey New York Pennsylvania	Alabama Arkansas Florida Georgia Kentucky Louisiana Mississippi North Carolina South Carolina Tennessee Virginia West Virginia	Arizona New Mexico Oklahoma Texas	Alaska California Hawaii Nevada Oregon Washington

Source: Bureau of Economic Analysis, U.S. Department of Commerce, 2000

Chart I.2 shows another way to look at the long-term convergence trend in regional income, the standard deviation of per capita income calculated for all states, for each year for the period 1929 through 1999. A standard deviation is a statistical measure of the degree to which a set of values varies around their mean. Chart I.2 shows, in general, a decline in the standard deviation in state personal income per capita since 1929, which means state personal income per capita moved closer to the U.S average during the last 70 years.

CHART I.1  
REGIONAL RELATIVE TO U.S. PER CAPITA INCOME  
BEA REGIONS

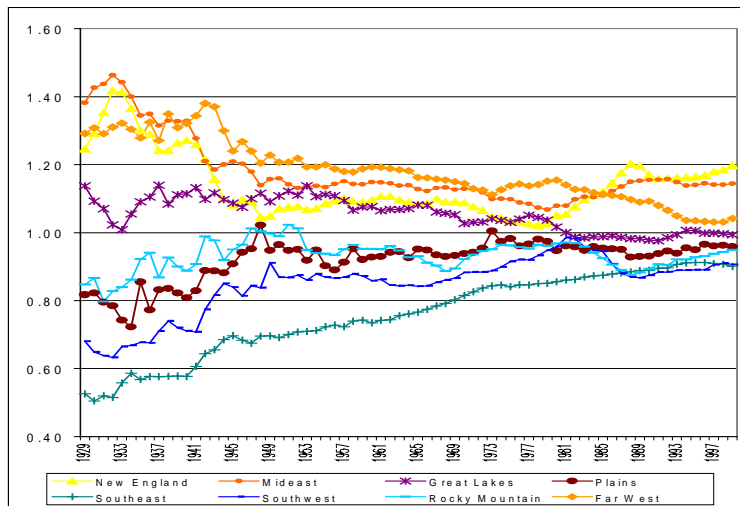


CHART I.2  
DISPERSION IN STATE PER CAPITA INCOME  
ANNUAL STANDARD DEVIATION 1929-1999

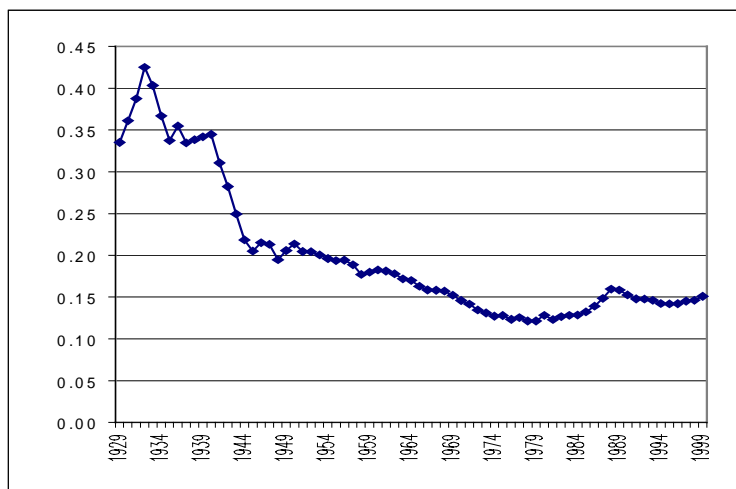


TABLE I. 2  
PER CAPITA REGIONAL PERSONAL INCOME 1929 AND 1999

Regions	Nominal Income (\$)		Percent of US Average (%)	
	1929	1999	1929	1999
New England	872	34,173	124.6	119.7
Mideast	967	32,628	138.1	114.3
Great Lakes	796	28,348	113.7	99.3
Plains	572	27,350	81.7	95.8
Southeast	368	25,703	52.6	90.0
Southwest	476	25,862	68.0	90.6
Rocky Mountain	593	27,072	84.7	94.8
Far West	904	29,727	129.1	104.1
Wisconsin	673	27,390	96.1	96.0
United States Average	700	28,542	100.0	100.0

Source: State Personal Income, 1929-1999, Bureau of Economic Analysis, U.S. Department of Commerce, 2000

Following its peak in 1933, the standard deviation in per capita income fell sharply during the remainder of the 1930s and 1940s and continued to decline, although more slowly, through the 1950s, 1960s and 1970s. At the end of the 1970s and the beginning of the 1980s, coinciding with the 1980 recession, in some regions the trend toward convergence was interrupted, as their per capita regional incomes began diverging from the national average. This is shown in Chart I.2 by the upward trend in the standard deviation in the last 20 years.

More specifically, as [Chart I.3](#) shows for the Plains, New England, the Southwest, the Mideast, and Rocky Mountain regions, per capita income has diverged sharply from the U.S. average in the last 20 years, rising above in New England and Mideast and dropping away from it in the Southwest, Rocky Mountains and Plains. In the three other regions, the Great Lakes, Southeast and Far West, the trend toward convergence continued ([Chart I.4](#)).

CHART I.3  
REGIONAL RELATIVE TO U.S. PER CAPITA INCOME  
RECENT DIVERGENCE

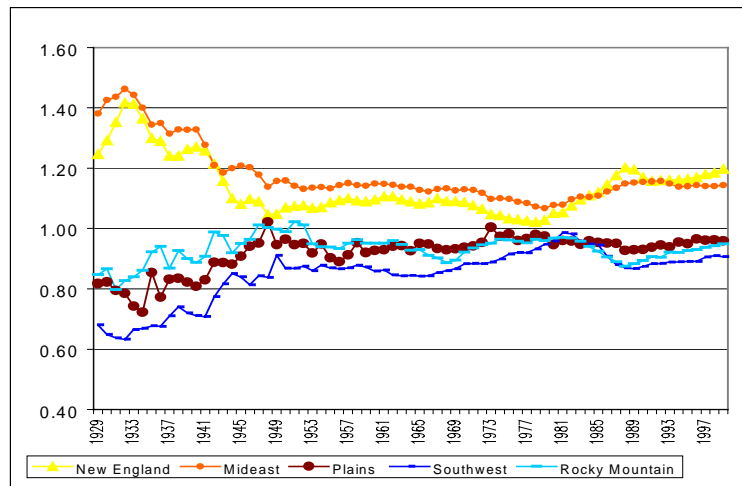
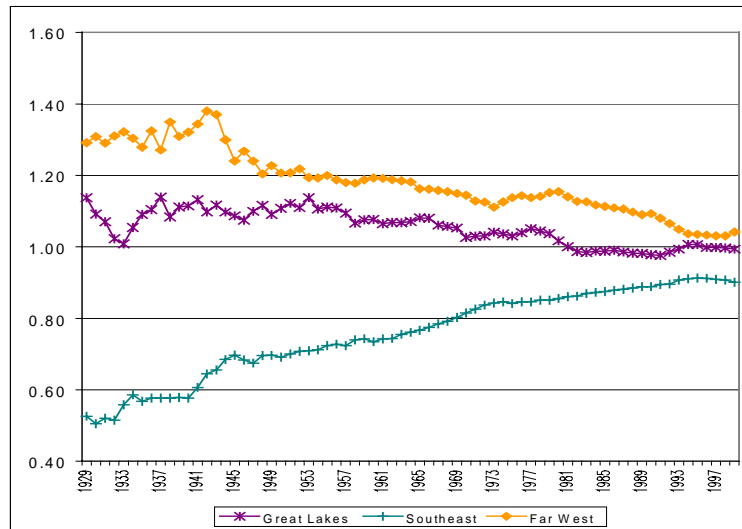


CHART I.4  
REGIONAL RELATIVE TO U.S. PER CAPITA INCOME  
LONG TERM CONVERGENCE



### Wisconsin and Long Term Convergence

Between 1929 and 1999, Wisconsin's per capita income has remained below the U.S. average with the exception of the periods of 1950-53 and 1978-81, when it slightly exceeded the U.S. average. Wisconsin's per capita income has remained below the Great Lakes Region per capita income during the whole period. As [Table I.2](#) shows, the ratio of Wisconsin's per capita income to the U.S. average in 1999 was almost the same as in 1929, while the Great Lakes per capita income declined from 113.7% to 99.3% during the same period of time. In general, it appears that five periods can be distinguished in describing major trends in Wisconsin per capita income:

1929-1944: during the Great Depression and through World War II, per capita income in Wisconsin was significantly below (less than 95% of) the national average.

1945-1951: during the recovery period following World War II, Wisconsin per capita income grew rapidly to approach—and even exceed—the national average.

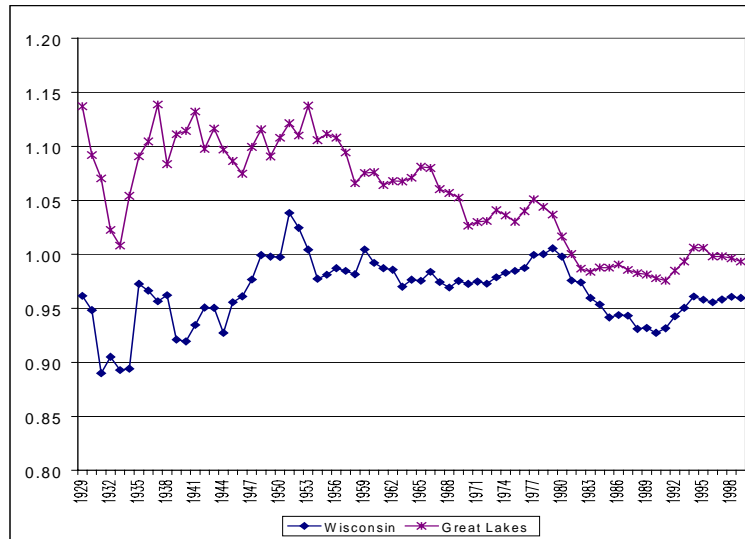
1952-1979: Wisconsin's per capita personal income remained generally within a few percentage points of, though usually below, the national average. It exceeded the U.S. average in 1978 and in 1979 it reached the 100.5% of the U.S. average, declining thereafter.

1980-1991: The 1980 recession caused a rather sharp decline in the regional (Great Lakes) and Wisconsin's per capita income.

1991-present: In the early 1990s, Wisconsin per capita income recovered, increasing from 92.7% of the U.S. average in 1990 to stabilizing around 96% of the national average by 1995.

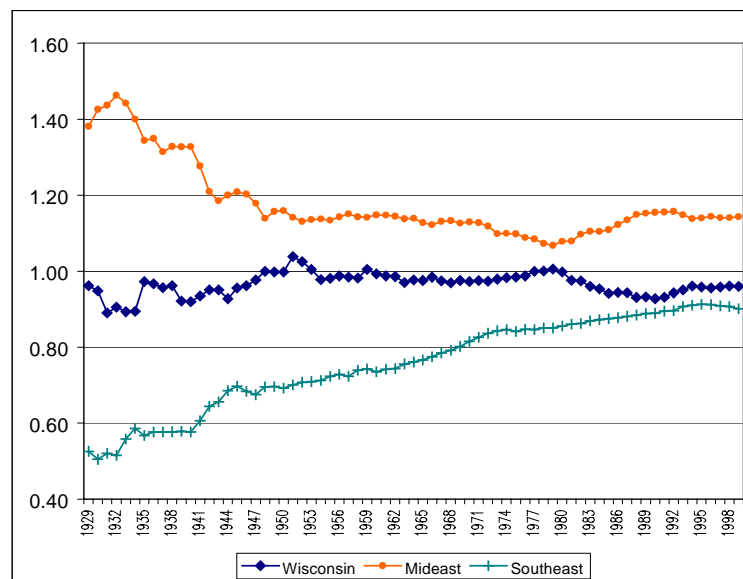
As seen in [Chart I.5](#), the 1980 recession caused a rather sharp decline in the regional (Great Lakes) and Wisconsin per capita income, with the regional income falling below the U.S. average for the first time. Wisconsin's relative per capita income declined to 92.7% in 1990, and increased afterwards. Since 1994, Wisconsin's per capita personal income remained at about 96% of the average U.S. level.

CHART I.5  
GREAT LAKES REGION AND WISCONSIN RELATIVE TO U.S.  
PER CAPITA INCOME



As shown in [Chart I.6](#), Wisconsin's per capita income has been consistently about half way between the highest of the high-income regions (Mideast) and the lowest of the low-income regions (Southeast). Furthermore, during the 1990s the difference between Southeast and Wisconsin has narrowed, and the difference between Mideast and Wisconsin has increased.

CHART II.6  
HIGHEST AND LOWEST REGIONS AND WISCONSIN RELATIVE  
TO U.S. PER CAPITA INCOME



**Summary**

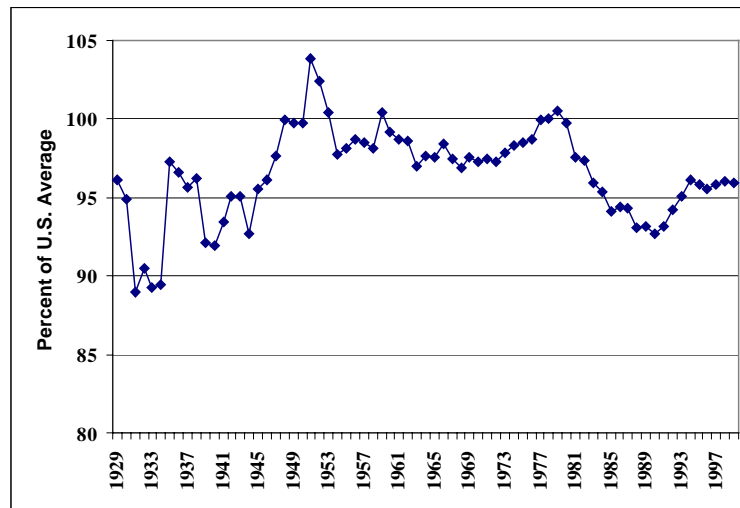
This descriptive analysis of trends in state and regional per capita income growth suggests that Wisconsin, with a long history of being near the U.S. average, may experience only average growth in the future, if the convergence hypothesis holds. For it is those states and regions farthest away from the U.S. average that have the greatest potential to more rapidly converge to the mean. If, however, there is evidence against convergence, then it may be possible for states and regions to experience shocks or innovations to per capita income that lead to deviations from convergence.

These shocks or innovations may be associated with industry or geographic specific features of labor and capital, with the sources of income, or possibly state economic policies. These issues will be addressed in Parts II to IV.

## II. ANALYSIS OF PERSONAL INCOME COMPOSITION TO EXPLAIN WISCONSIN-U.S. INCOME DIFFERENCES

Part I discussed the long-term trends in Wisconsin's per capita personal income and compared it to national and regional trends. It was pointed out that between 1929 and 1999, regional per capita incomes have converged to the U.S. average. During the same time, however, Wisconsin's per capita personal income has remained below the U.S. average (Chart II.1), with the exception of the periods of 1950-53 and 1978-81, and has remained below the Great Lakes Region per capita income during the entire period.

CHART II.1  
WISCONSIN PER CAPITA PERSONAL INCOME  
AS A PERCENT OF U.S. AVERAGE



Part II looks for factors that explain why Wisconsin's per capita personal income has remained below the U.S. average. This is done by decomposing per capita personal income into its major components and by examining the changes in these components over time in relation to the corresponding U.S. components. Unless otherwise noted, the measure of per capita personal income in this report is expressed in relative terms, i.e., the level of Wisconsin per capita income and its components are compared to the corresponding U.S. averages.

The analysis reveals that declining relative wage rates and declining relative proprietors' income are major factors responsible for Wisconsin's per capita personal income being lower than the U.S. average.

### Major Components Of Personal Income

The major components of personal income are introduced and discussed in this section using 1999 Wisconsin personal income as an illustration.

TABLE II.1  
COMPONENTS OF PERSONAL INCOME  
WISCONSIN 1999

	Major Components of Personal Income	Amount (\$000)	%
1	Wage and salary disbursements	\$83,367,194	58.0%
2	Other labor income	8,965,989	6.2
3	Proprietors' income	8,294,566	5.8
4	Contributions for social insurance	-6,313,024	-4.4
5	Earnings by place of work	94,314,725	65.6
6	Residence Adjustments	2,538,394	1.8
7	Earnings by place of residence	96,853,119	67.3
8	Property Income	29,310,029	20.4
9	Transfer payments	17,648,239	12.3
10	Personal income	\$143,811,387	100.0%

As shown in Table II.1, the largest component of personal income is wage and salary disbursements, accounting for \$83.4 billion or 58% of personal income in Wisconsin in 1999. Another component of personal income associated with earnings by place of work is "other labor income" which includes employers' contributions to pension and profit sharing plans, group health and life insurance, and workers' compensation. Other labor income totaled \$8.9 billion or 6.2% of personal income in 1999.

Proprietors' income is the income of sole proprietorships, partnerships, and tax-exempt cooperatives. This type of income may represent a payment for the labor of business owners, a return to capital invested by the business owners or a combination thereof. Proprietors' income accounted for about \$8.3 billion, or 5.8% of total personal income in Wisconsin in 1999. Proprietors' income consists of two parts; nonfarm proprietors' income, which accounted for about 96.5% of proprietors' income, and farm proprietors' income, which accounted for the remaining 3.5 percent.

Contributions for social insurance are the payments made by employees for Social Security, state unemployment insurance, temporary disability insurance, and veterans' life insurance. It is a subtraction from personal income and in 1999 Contributions for social insurance totaled \$6.3 billion, or 4.4% of personal income.

Wages and salaries, other labor income, proprietors' income, and contributions for social insurance are the four personal income components measured by place of work. They sum to the earnings by place of work category, as shown in Table II.1, line 5. In 1999, earnings by place of work totaled more than \$94 billion, or more than 65% of personal income in Wisconsin.

State personal income is a measure of the income received by residents of a state. The components of personal income discussed thus far, however, are reported by place of work rather than by place of residence. Residence adjustments (line 6) are accounting measures used to convert earnings from a place of work basis to a place of residence. This estimate is derived from data on commuting patterns, and shows the net amount of income earned by state residents from out-of-state employment. Since Wisconsin has two of the nation's largest metropolitan areas (Chicago and Minneapolis/St Paul) near its borders, Wisconsin residents earn more income out-of-state than non-residents earn in Wisconsin. Thus, the residence adjustments are positive. Adding the residence adjustments to earnings by place of work yields earnings by place of residence (line 7).

Two other major components of personal income are reported on a place-of-residence basis. These include property income transfer payments. Property income is the sum of Dividend income, Interest income and Rental income. Dividend income is payments made by corporations to shareholders. Interest income is the monetary and imputed interest income from all sources received by individuals, employee retirement plans, nonprofit institutions, and estates and trusts. The rental income of persons is the net income of persons from the rental of real property, including imputed rents and royalties. Dividends, interest and rent totaled \$29 billion or 20% of personal income in 1999.

Transfer payments is income received by persons for which no current services are performed. They are payments by government and business to individuals and nonprofit institutions serving individuals. Government payments of retirement and disability insurance benefits to individuals (mostly Social Security benefits) accounted for 46 percent of total transfer payments in Wisconsin in 1999. Medical payments such as Medicare payments and public assistance medical care accounted for another 35 percent of total transfer payments. Other payments included unemployment insurance and veteran benefit payments. Transfer payments accounted for \$17.6 billion, which is more than 12% of total personal income.

### **Wisconsin Relative Per Capita Income by Component**

An exact decomposition of the deviations of Wisconsin personal income from the U.S. can be calculated. This decomposition subtracts from each component of Wisconsin per capita personal income (wages and salaries, transfer payments, etc.) its U.S. counterpart. This difference is then divided by U.S. total per capita personal income. The percent deviation in total Wisconsin per capita personal income is then the sum of the deviations in each of the income components. For the purpose of this decomposition, the residence adjustment is added to wage and salary disbursements to arrive at net wage and salary income per capita on a place of residence basis.

Table II.2 presents this decomposition for 1959 and 1999. The table shows per capita income by component for both Wisconsin and the U.S. along with the deviation and percent deviation.

In 1959, Wisconsin's per capita personal income was very near (0.42% above) the U.S. average. This was the net result of positive and negative contributions from the major income components. The decomposition in Table II.2 indicates that Wisconsin's wage and salary income was responsible for lowering Wisconsin personal income relative to U.S. personal income by 2.64%. This was more than offset by Wisconsin's relatively strong proprietors' income which was responsible for raising Wisconsin's income by 3.45% relative to the U.S. The other components of personal income such as transfer payments and other income had relatively minor contributions to Wisconsin's deviation from the U.S. average.

By contrast, in 1999, Wisconsin's per capita personal income was 4.04% below the U.S. average. The decomposition in Table II.2 indicates that the most important contribution to this deviation came from proprietors' income, which lowered Wisconsin per capita personal income 3.01% relative to the U.S. average. The other important contribution came from transfer payments, which lowered Wisconsin income 1.28% relative to the U.S. average. Wages and salary income per capita did not deviate much from the U.S. average in 1999.

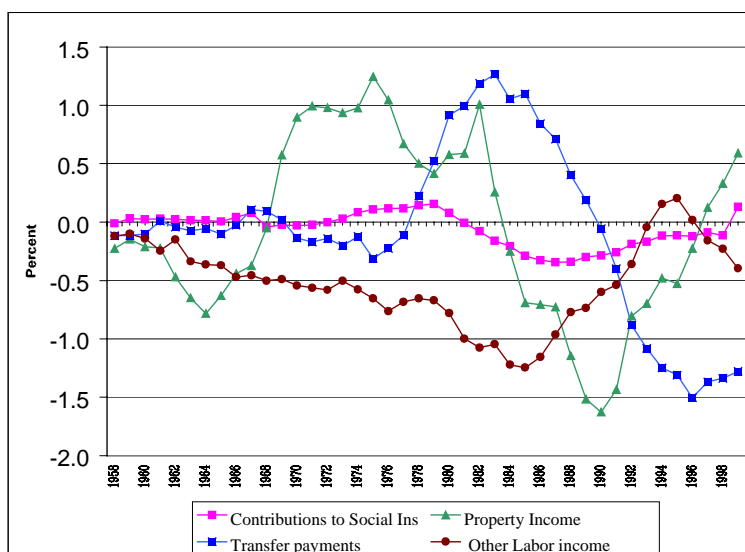
TABLE II.2  
DEVIATIONS OF WISCONSIN FROM US PER CAPITA PERSONAL INCOME

Income Component	1959				1999			
	WI	US	Deviation from U.S.		WI	US	Deviation from U.S.	
	\$	\$	\$	% *	\$	\$	\$	% *
Personal income	2,224.6	2,215.4	9.2	0.42	27,390.3	28,542.0	(1,151.7)	-4.04
Contributions for social insurance	34.4	33.7	0.7	0.03	1,202.4	1,239.3	(36.9)	-0.13
Dividends, interest, and rent	284.7	287.9	(3.3)	-0.15	5,582.4	5,413.9	168.5	0.59
Transfer payments	134.0	136.6	(2.6)	-0.12	3,361.3	3,726.6	(365.3)	-1.28
Wage and salary+ adj for residence	1,397.9	1,456.4	(58.5)	-2.64	16,361.6	16,380.3	(18.7)	-0.07
Other labor income	72.7	74.9	(2.2)	-0.10	1,707.7	1,821.1	(113.4)	-0.40
Proprietors' income	369.7	293.2	76.5	3.45	1,579.8	2,439.5	(859.7)	-3.01
Farm proprietors' income	118.5	61.7	56.7	2.56	41.8	99.3	(57.4)	-0.20
Nonfarm proprietors' income	251.3	231.5	19.8	0.89	1,538.0	2,340.2	(802.3)	-2.81

\*as a % of U.S. per capita personal income.

An application of this methodology to all the years from 1959 to 1999 allows for the identification of trends. Chart II.2 shows how four components of income -- property income, transfer payments, personal contributions for social insurance and other labor income -- have contributed to the deviation of Wisconsin income from the U.S. average over the last 40 years. In general, contributions of these components have been minor -- in the range of 1.5% above to 1.5% below the zero deviation line, and often near zero. None of these components show a marked change over time. Therefore, the explanation for Wisconsin's relative per capita personal income performance is not likely to be found in this group of income components.

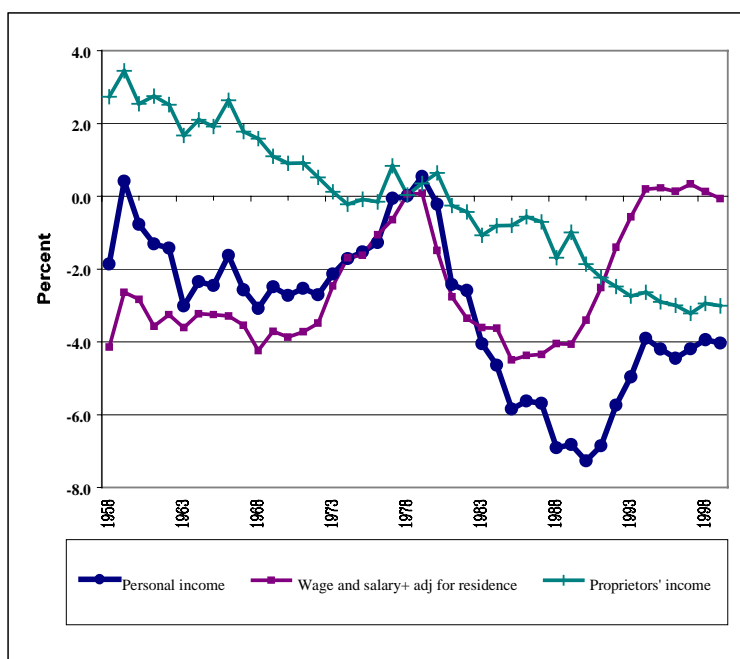
CHART II.2  
SELECTED COMPONENTS OF WISCONSIN PER CAPITA PERSONAL INCOME:  
DEVIATION OF WISCONSIN FROM U.S.  
AS A PERCENT OF U.S. PERSONAL INCOME



By contrast, proprietors' income and wage and salary income show much larger contributions to the deviation of Wisconsin income from the U.S. average. Chart II.3 shows the deviation of total personal income and the contributions of wage and salary income and proprietors' income to that total. The deviations of wage and salary income and proprietors' income range from nearly 4% above the zero line to 4% below the zero line. Movements in Wisconsin wage and salary income "explain"

much of the fluctuations of total per capita personal income. Wisconsin proprietors' income shows a persistent downward trend.

CHART II.3  
WAGES AND SALARIES AND PROPRIETORS' INCOME:  
DEVIATION OF WISCONSIN FROM U.S.  
AS A PERCENT OF U.S. PERSONAL INCOME



### Factors Behind Changes In Wage and Salary Income

Chart II.3 provides evidence that Wisconsin's lower than average per capita personal income and its fluctuations over time can be attributed in large measure to the changes in per capita wage and salary income.

Per capita wage and salary income can be further decomposed into wage and salary income per job (the average annual wage) and the ratio of jobs to population (job intensity). Stated algebraically;

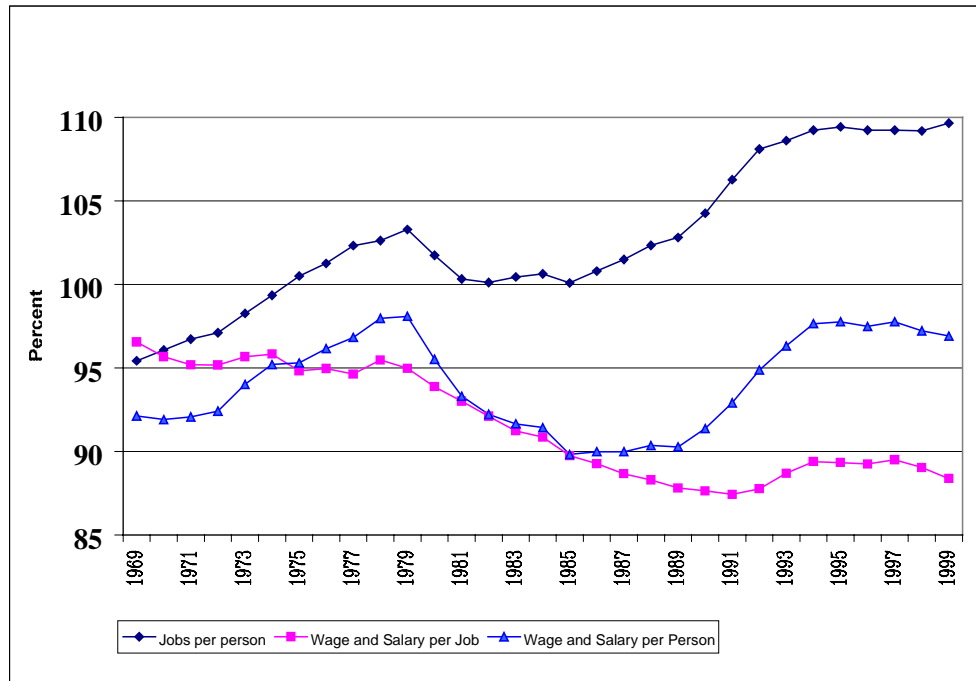
$$\frac{\text{wage and salary income}}{\text{population}} = \frac{\text{wage and salary income}}{\text{jobs}} \times \frac{\text{jobs}}{\text{population}}$$

Both the average annual wage and job intensity are compared to the corresponding U.S. averages and shown in Chart II.4.

For the purpose of this analysis the residence adjustment has not been included with the wage and salary income. Employment data is only available on a place-of-work basis and the inclusion of the residence adjustment would overstate the Wisconsin wage rate. The exclusion of the residence adjustment removes a small upward trend in Wisconsin's relative per capita income.

Chart II.4 presents the information for Wisconsin as a percent of the U.S. average, where 100 equals the U.S. average. By decomposing per capita wages into job intensity and average wage, interesting trends emerge. Wisconsin job intensity (jobs per person) shows a distinct upward trend, increasing from about 95% of the U.S. average to almost 110% of the U.S. average. By contrast, Wisconsin's average annual wage shows a persistent decline from about 95% of the U.S. average in 1969 to about 87% of the U.S. average in 1990, after which it gradually increased and stabilized at about 89%.

CHART II.4  
DECOMPOSITION OF WAGE AND SALARY PER CAPITA INCOME:  
WISCONSIN AS PERCENT OF U.S.



The net impact of these two divergent trends is that Wisconsin's per capita wage and salary income fluctuated between 90% and 98% of the U.S. average. From 1969 to 1979, Wisconsin's average annual wage was relatively steady, while job intensity increased, causing per capita wages to increase. During the 1980's, job intensity decreased (due to high unemployment) and the relative wage fell, causing a sharp drop in per capita wages. In the 1990's, relative wages have increased slightly and job intensity has increased markedly creating an increase in per capita wages.

A higher job intensity and a lower average wage could be explained by a disproportionately large number of part-time jobs in Wisconsin. This would inflate the number of jobs and affect both ratios. We are unaware of evidence to support this.

### Decomposition of Changes In Proprietors' Income

The analysis of the deviation of Wisconsin per capita personal income presented above identified a sustained decline in proprietors' income relative to the U.S. average. In a manner similar to the job intensity and average wage decomposition of wage and salary income, proprietors' income per capita can be decomposed as follows:

$$\frac{\text{proprietors' income}}{\text{population}} = \frac{\text{proprietors' income}}{\text{number of proprietors}} \times \frac{\text{number of proprietors}}{\text{population}}$$

The ratio of proprietors' income to the number of proprietors can be thought of as the average earnings of proprietors, analogous to a wage rate, or an average return to ownership. The ratio of the number of proprietors to population can be thought of as the "entrepreneurship rate".

Chart II.5 illustrates this decomposition. The chart shows that Wisconsin per capita proprietors' income as a percent of the U.S. average has declined steadily due to the influence of both factors. First, the entrepreneurship rate has declined from 114% of the U.S. average to about 98% by the late 1980's and stabilized at this level. Second, income per proprietor has declined from about 96% of the U.S. average in 1969 to about 66% in 1999. Both of these trends are explained in part by the decline in farm earnings and the related decline in the number of farm proprietors. The earnings of nonfarm proprietors, however, have also declined in a similar manner from 97% of the U.S. average in 1969 to 73% in 1999.

CHART II.5  
DECOMPOSITION OF PROPRIETORS' INCOME PER CAPITA:  
WISCONSIN AS PERCENT OF U.S.

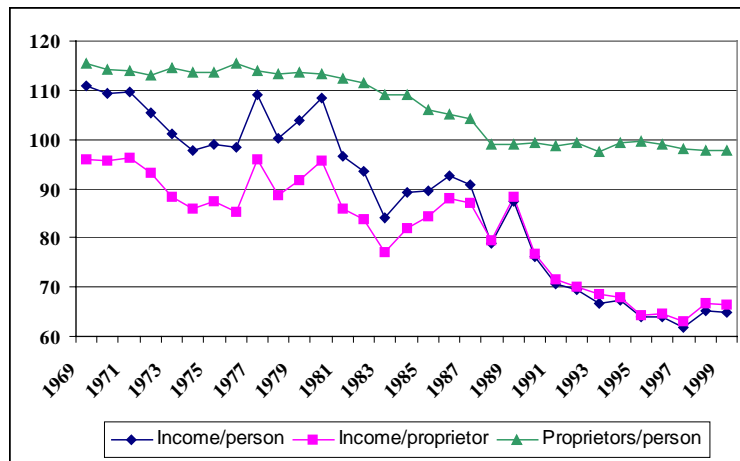
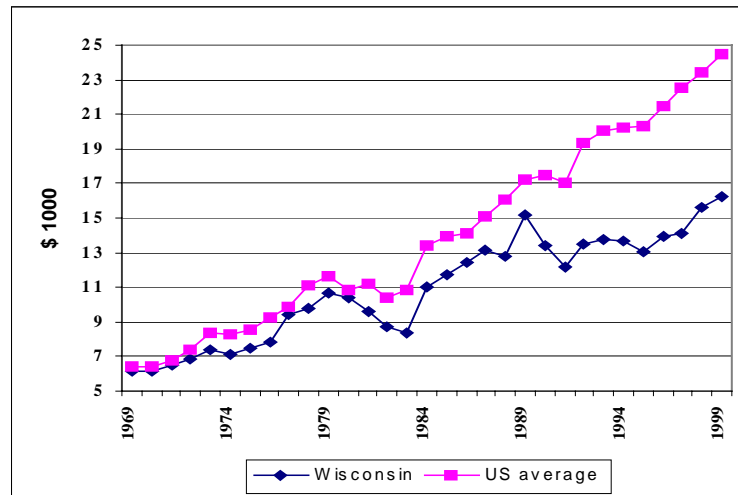


CHART II.6  
AVERAGE PROPRIETOR INCOME  
WISCONSIN AND U.S.



In 1969, average proprietors' income was almost the same in Wisconsin, at \$6,150, as in the United States, at \$6,410. By 1999, average proprietors' income in Wisconsin and the U.S. had diverged significantly--\$16,200 compared to \$24,500 respectively. These trends are shown in Chart II.6.

If we examine the contribution of proprietors' income to state personal income in all states for 1999, we find that Wisconsin proprietors' income had one of the smallest contributions. With a contribution of only 5.8% it was fourth from the bottom in rank, exceeding only Delaware, Maryland, and Virginia.

### Summary

Part II defined and analyzed trends in major components of per capita personal income in Wisconsin and compared it to the national trends. The analysis revealed that wage and salary income and proprietors' income in Wisconsin appear to be the components of personal income most responsible for Wisconsin's per capita personal income being lower than the U.S. average. Between 1959 and 1999 relative per capita personal income in Wisconsin was influenced by a cyclical pattern in per capita wage and salary income and a long-term downward trend in proprietors' income per capita.

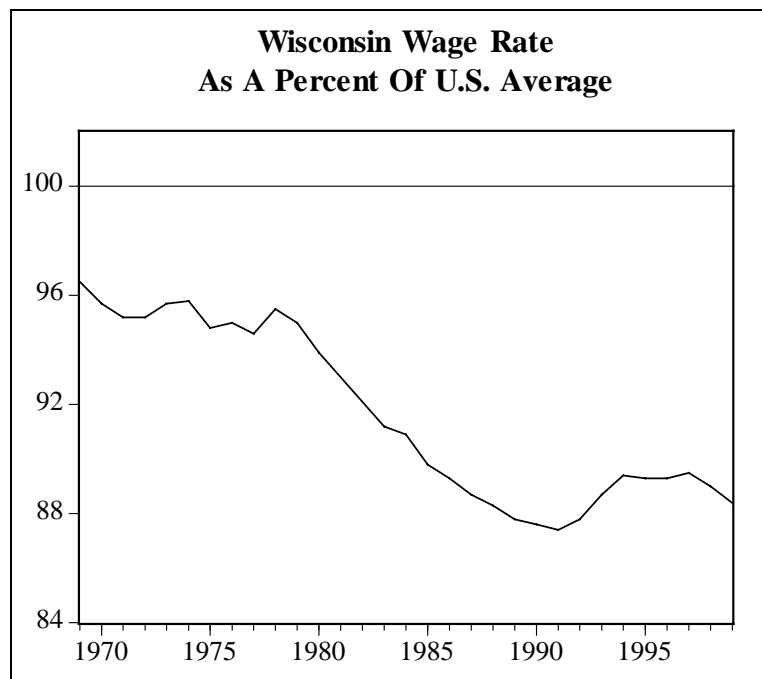
### III. CHANGING INDUSTRY MIX AND RELATIVE WAGE GROWTH

#### Introduction

Part III investigates the decline in Wisconsin's relative wage per job. Part II revealed that between 1959 and 1999, relative per capita personal income declined in Wisconsin, influenced by a cyclical pattern in per capita wage and salary income and a long-term downward trend in proprietors' income per capita.

Furthermore, the analysis revealed that one major reason for the lower personal per capita income relative to the U.S. has been a decline in the relative wage per job in Wisconsin. In fact, the Wisconsin relative wage declined from 95.5% of the U.S. average in 1978 to 87.4% of the U.S. average in 1991. Since 1991, the Wisconsin relative wage per job has increased to 88.4% of the U.S. average in 1999 (see Chart III.1). The negative impact of a declining relative wage per job on personal income was reduced by an increasing ratio of jobs per person, as more and more Wisconsin residents entered the labor market.

CHART III.1



#### Relative Wage Rates by Industry Groups

The decline in Wisconsin's average wage rates relative to U.S. averages has not been limited to a few industry groups. Rather it has occurred in all major industry groups. Table III.1 shows Wisconsin average annual wage rates for all industries and major industry groups. During the 1969 to 1999 period, the all industry average annual wage in Wisconsin declined from 96.5% of the U.S. average to 88.4% of the U.S. average, a decline of 8.1 percentage points.

TABLE III.1  
WISCONSIN WAGE RATES  
AS A PERCENT OF THE U.S.

	1969	1999	Difference
All Industries	96.5	88.4	-8.1
Mining	99.0	73.2	-25.8
Construction	107.1	105.5	-1.6
Durable goods	98.3	87.2	-11.1
Nondurable goods	108.5	94.5	-14.0
Trans and utilities	93.1	83.0	-10.1
Wholesale trade	95.9	86.1	-9.8
Retail trade	87.5	85.4	-2.1
Fin., Ins. and R.E.	93.2	74.5	-18.7
Services	88.6	82.6	-6.0
Government	94.6	91.0	-3.6

Although every industry group experienced a decline in wage rates relative to the U.S. average, the largest declines occurred in mining (-25.8%), finance, insurance and real estate (-18.7%), and manufacturing. Nondurables manufacturing exhibited a 14% decline in relative wage and durables manufacturing showed an 11.1% decline. Mining is a relatively small industry in Wisconsin, and because of its small size, changes in the mining relative wage rate do not significantly impact the total (all industries) relative wage. Therefore, mining will not be analyzed further in this study. The industry group with the smallest decline in the relative wage is construction, where the average wage remains above the U.S. average. Relative wage rates for selected industry groups are shown in Charts III.2, III.3 and III.4.

CHART III.2

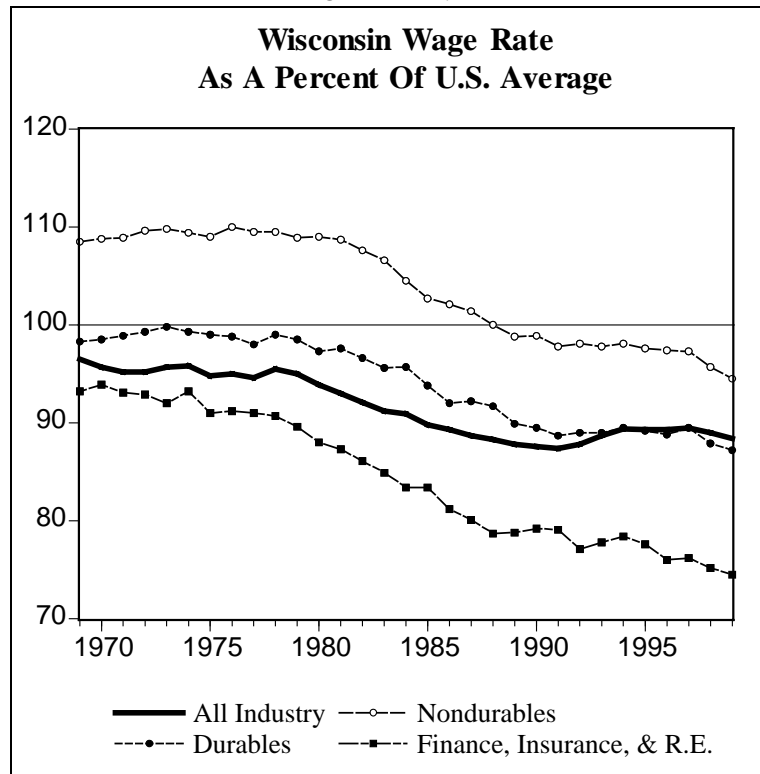


CHART III.3



CHART III.4



The decline in relative wage rates in manufacturing is important for two reasons. First, manufacturing is considered a "base" industry, capable of yielding multiplier effects throughout the rest of the economy. A declining relative wage in an economy's base industries will likely lead to downward pressure in that economy's "local" industry wage rates. Second, manufacturing jobs have traditionally been high paying jobs, both with respect to jobs in other industries, and with respect to manufacturing employment in other states. The declining relative wage in Finance, Insurance and Real Estate (FIRE) is also potentially of great significance because some of the industries within the FIRE group are also considered to be base industries. Because of their importance, manufacturing and FIRE are selected for more detailed analysis below.

Relative wages in the fast growing trade and service industries have shown a more modest decline in relative wages. Although relative wage rates in these two industries have been consistently below the U.S. average throughout the 1969 to 1999 period, their slower rates of decline results in a smaller contribution to the observed decline in the overall (all industry) relative wage rate. The transportation, communications, and utilities industry group has exhibited a 10% decline in its relative wage rate over the 1969 to 1999 period, mostly as a result of the communications industry, which declined from 93.0% of the U.S. average in 1969 to 75.4% of the U.S. average in 1999.

### **Changes in Manufacturing Wages – Industry Analysis**

A peak year for Wisconsin per capita income was 1978. Manufacturing industries were strong and growing in the late 1970's. Wages in durable goods manufacturing industries were at 99% of the U.S. average; wages in nondurable goods manufacturing industries were 109% of the U.S. average. However, beginning in the difficult years of the early 1980's the relative wage in both durable and nondurable goods began to decline. Between 1978 and 1999 the relative wage in durable goods fell 11.8% from 99.0% to 87.2% of the U.S. average. In nondurable goods the relative wage fell 15.0% from 109.5% to 94.5%. Although the declines were similar in magnitude, a more detailed analysis of the decline, using more detailed industry data, reveals that some of the underlying dynamics were different.

In durable goods the dominant reason for the decline can be discerned from the data in Table III.2, which shows a large (-16.6%) decline in the relative wage rate in industrial machinery, and a similarly large (-16.4%) decline in the relative wage rate in electronic equipment and instruments. These are the largest durable goods industries in Wisconsin, comprising 46.7% of employment in durable goods in 1999. (Note: electronic equipment and instruments were combined as one industry in this analysis because changes in industry classifications associated with the 1987 SIC codes resulted in about 7000 jobs being subtracted from the electronic equipment industry and added to the instruments industry. The analysis of wage rates for these industries as separate industries would be problematic because of data discontinuities.)

TABLE III.2  
DURABLE GOODS SUMMARY

Industry	% Change in Relative Wage 1978 to 1999	Percent Share of Employment 1999	Wage Rates 1999 \$ Thousands	Employment Change 1978 to 1999
Durable goods	-11.8	100.0	38.468	-49,567
Lumber and Wood Products	-1.5	8.9	26.304	3,044
Furniture	-8.9	4.7	30.111	3,277
Stone, clay	-5.9	3.0	36.116	-1,441
Primary metal	4.8	6.8	38.706	-7,614
Fabricated metal	-7.9	18.0	35.012	-2,272
Industrial machinery	-16.6	29.7	42.220	-19,792
Electronic equipment & instruments	-16.4	17.0	40.992	-7,250
Motor vehicles	2.1	5.9	52.012	-14,728
Other transportation equipment	2.6	3.0	41.442	-2,590
Miscellaneous manufacturing industries	-8.6	3.1	29.402	-201

In order to gain greater insight into the change in relative wages we calculated what Wisconsin wages would have been in each individual industry in 1999 if the relative wage had not changed between 1978 and 1999. This calculation yields two interesting results. First, if the relative wage rates had not declined, durable goods manufacturing wages would have been \$1.606 billion higher in 1999. Second, \$1.3981 billion of this amount (70%) is attributable to changes in two industry groups, industrial machinery, and electronic equipment and instruments.

Wisconsin durable manufacturing wages can also be recalculated assuming that the relative wage rate of all durable goods industries combined had not changed between 1978 and 1999. This calculation, leaving the employment shares fixed at 1978 values, shows that durable goods manufacturing wages would have been \$1.978 billion higher in 1999. The \$376 million difference between this number and the \$1.606 billion cited above represents the impact of changes in industry mix, i.e., some industries are growing faster than others. The impact of industry mix has been to lower Wisconsin's relative wage and is in large measure due to the relatively rapid growth in the lumber and wood products and the furniture industries. These industries have wage rates that are below the average for all durable goods.

In the nondurable goods manufacturing industries, the Wisconsin relative wage declined by 15.0%, from 109.5% of the U.S. average to 94.5% of the U.S. average. The decline in the relative wage is attributable to both unfavorable changes to Wisconsin's industry mix and to declines in the relative wage in several important industries.

Using the same methodology applied to durable goods industries above, we calculated what Wisconsin wages would have been in each industry in 1999 if the relative wage had not changed between 1978 and 1999. This calculation shows that if the relative wage had not declined, nondurable goods manufacturing wages would have been \$643 million higher in 1999. This result is primarily attributable to the decline in relative wages in the food, printing, and chemical industries which account for 95% of the wage rate decline (see Table III.3).

In order to calculate the impact of industry mix, Wisconsin nondurable manufacturing wages were recalculated assuming that the industry group relative wage had not changed between 1978 and 1999, again holding employment shares constant. This calculation shows that under this assumption that nondurable goods manufacturing wages would have been \$1.394 billion higher in 1999. The \$750 million difference between this number and the \$644 cited above represents the impact of changes in industry mix. The impact of industry mix has been to lower Wisconsin's relative wage

rate in nondurables and is in large measure due to the relatively rapid growth in the printing and publishing, and rubber and plastics industries. These two industries account for all of the net increase in employment over the 1978 to 1999 period (see Table III.3 column 4). The industry mix effect is negative because the wage rates in these industries are below the average of all nondurable goods (see Table III.3 column 3).

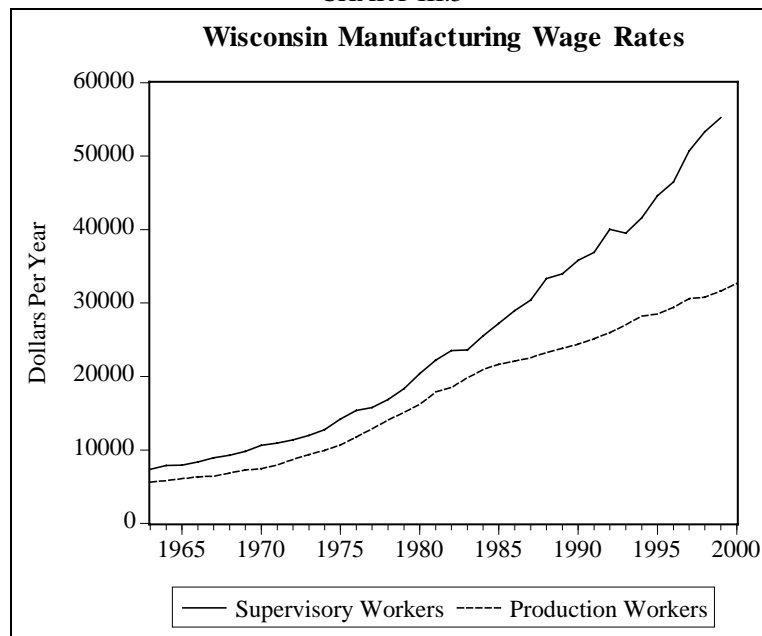
TABLE III.3  
NONDURABLE GOODS SUMMARY

Industry	% Change in Relative Wage 1978 to 1999	Percent Share of Employment 1999	Wage Rates 1999 \$ Thousands	Employment Change 1978 to 1999
Nondurable goods	-15.0	100.0	36.438	45,897
Food and kindred products	-7.3	27.4	33.526	1,953
Textile mill products	24.7	1.1	35.731	-3,272
Apparel and other textile products	-0.6	2.5	24.750	-1,026
Paper and allied products	-1.6	21.9	46.987	5,783
Printing and publishing	-13.3	23.0	31.452	25,065
Chemicals and allied products	-18.4	6.1	50.427	4,959
Rubber and misc. plastics products	-0.7	16.2	31.696	20,052
Leather and leather products	-21.9	1.7	26.926	-7,632

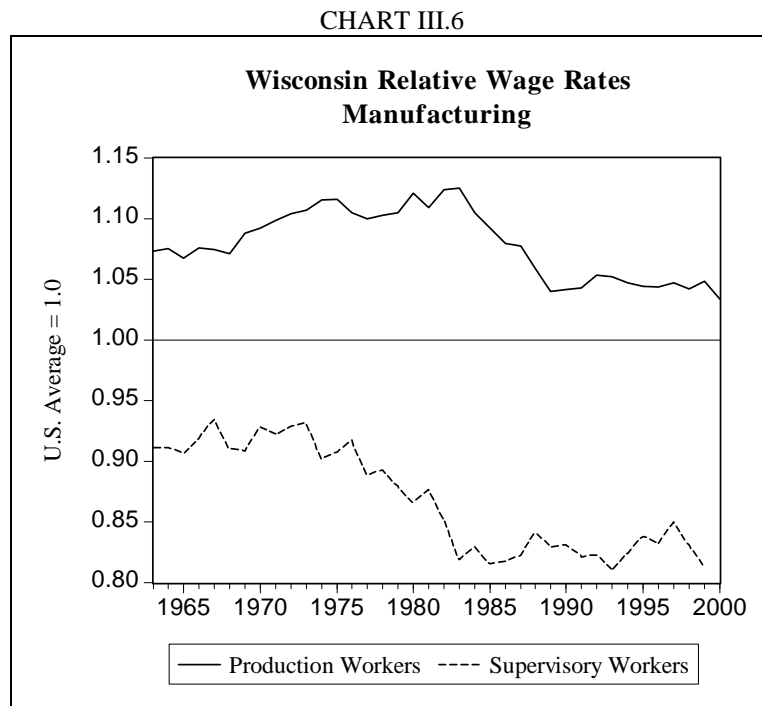
### Manufacturing Wages – Supervisory vs. Production Workers

This section examines manufacturing wages from a different perspective, by looking at the wage rates for supervisory workers and production workers. This is tantamount to looking at wage rates for two very broad occupational groups. Supervisory workers are persons in executive and managerial positions and persons engaged in activities such as accounting, sales, advertising, routine office work, and professional and technical functions. Wage rates for production workers are generally less than that of supervisory workers, with the gap between the two groups widening over the past twenty years, as seen in Chart III.5.

CHART III.5



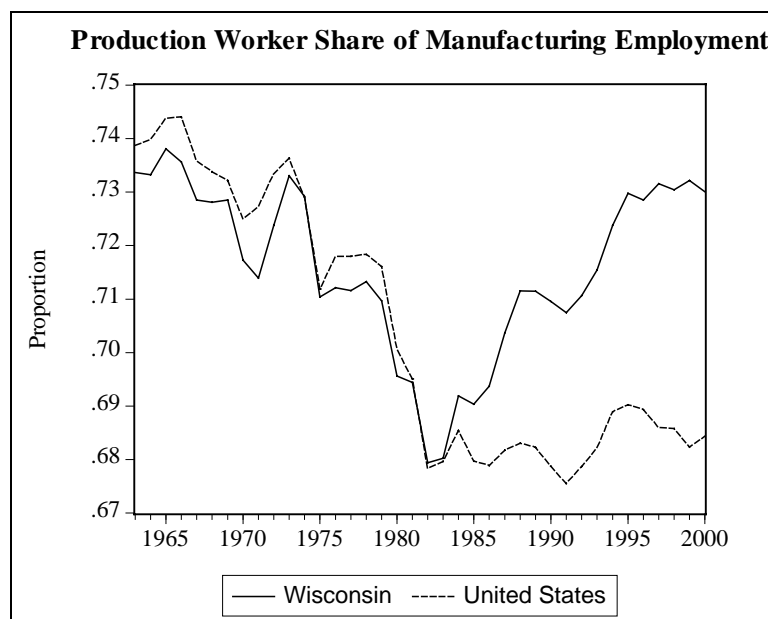
In Wisconsin, wage rates for production workers are above the U.S. average, while wage rates of supervisory workers are markedly less than the U.S. average. Relative manufacturing wage rates are shown in Chart III.6.



The impact of Wisconsin's lower relative wage rate for supervisory workers on the average annual wage rate in manufacturing can be estimated by calculating what the Wisconsin wage rate would be if supervisory workers were paid the national average wage. Using this assumption, the average annual wage in the durable goods sector in 1999 would have been 9.8% higher (\$42,534 vs. \$38,747) and the average annual wage in the nondurable goods sector in 1999 would have been 7.5% higher (\$39,451 vs. \$36,685). The reason for the lower average supervisory wage in Wisconsin is not clear, however one possible explanation is that there may be proportionately fewer corporate headquarters in Wisconsin. Corporate headquarters have the highest paid employees and tend to concentrate in large metropolitan areas.

Another factor affecting the average manufacturing wage is that Wisconsin has a higher ratio of production workers to total workers than the national average. This is especially true since 1985, as shown in Chart III.7. This has a negative impact on the average annual wage because production worker wages average less than supervisory worker wages.

CHART III.7



The impact of Wisconsin's higher concentration of production workers on the average annual wage rate in manufacturing can be estimated by calculating what the Wisconsin wage rate would be if production workers constituted the same proportion of total manufacturing employees as occurs in the U.S. Using this assumption, the average annual wage in the durable goods sector in 1999 would have been 3.5% higher (\$40,099 vs. \$38,747) and the average annual wage in the nondurable goods sector in 1999 would have been 2.5% higher (\$37,617 vs. \$36,685). The reason for the higher concentration of production workers in Wisconsin is also not clear. Having proportionately fewer corporate headquarters in Wisconsin might also explain the concentration of production workers.

Whatever the explanation, it is clear that the lower average wage for the supervisory worker and the lower concentration of supervisory workers in Wisconsin helps to explain the lower average annual wage in manufacturing in Wisconsin. This explanation does not conflict with, but rather complements the industrial analysis presented above.

### Finance, Insurance and Real Estate

Table III.1 identified the Finance, Insurance and Real Estate group (FIRE) as the industrial group which has experienced the largest decline (-18.7%) in relative wage rates during the 1969 to 1999 period. Although the FIRE industry group comprises only about 5% of Wisconsin total nonfarm employment, it can be considered, in part, a base industry because some proportion of financial and insurance services are "exported" to persons outside Wisconsin. Therefore, the sharp decline in the Wisconsin relative wage is a potential cause for concern.

Examination of the industry detail within the FIRE group reveals that the decline in relative wage rates was largely consistent across the industry components (see Table III.4). The only industry group that experienced a small decline in the relative wage was the real estate group. Real estate is largely a local industry.

TABLE III.4  
FINANCE, INSURANCE AND REAL ESTATE (FIRE) WAGE RATES  
AS A PERCENT OF U.S.

	1969 Relative Wage	1999 Relative Wage	1969 to 1999 Difference	1969 to 1999 Employment Growth
Total	93.2	74.5	-18.7	152%
Depository Institutions	93.0	73.7	-19.3	112%
Security Brokers	98.6	72.2	-26.3	292%
Insurance Carriers	98.1	82.7	-15.4	135%
Insurance Agents & Services	98.1	80.6	-17.5	331%
Real Estate	81.0	77.4	-3.5	157%

In order to gain a greater insight into the causes for the sharp decline in the Wisconsin relative wage in the FIRE industries, we examined the relative wage rate in all 50 states and the District of Columbia. This analysis revealed that the distribution of relative wage rates across states is very skewed in the FIRE industries. In fact only 6 states (New York, Connecticut, Massachusetts, New Jersey, Illinois, and California) and the District of Columbia had wage rates above the national average in 1999 (see Table III.5) while 44 states had relative wage rates below the national average. Clearly, FIRE is an industry where the national average wage is dominated by very high wage rates in a few East Coast states. Furthermore, the amount by which the high wage states exceed the national average has increased dramatically during the 1969 to 1999 period.

TABLE III.5  
STATE FINANCE, INSURANCE AND REAL  
ESTATE (FIRE) WAGE RATES  
AS A PERCENT OF U.S., SELECT STATES

	1969	1999	Difference
California	106	107	1
Connecticut	103	150	47
District of Columbia	95	140	45
Illinois	104	112	8
Massachusetts	104	132	28
New Jersey	100	121	21
New York	119	187	68
Wisconsin	93	75	-18
Indiana	92	72	-20
Iowa	88	72	-16
Michigan	101	82	-19
Illinois	104	112	8
Minnesota	103	94	-9

Given the skewed distribution of the relative wage in FIRE across states, the median of the distribution becomes a more meaningful indicator of central tendency. Viewed from this perspective, Wisconsin's relative wage experience in FIRE has not been nearly so discouraging. In 1969 Wisconsin's relative wage in FIRE was 93% of the U.S. average, but 2% above the median state. By 1999 Wisconsin's relative wage had fallen to 75% of the national average, but the median state's relative wage had fallen similarly to 76% of the U.S. average.

Comparing Wisconsin's experience to that of neighboring states, FIRE wage rates are very similar to Indiana, Iowa and Michigan, but contrasts with that of Illinois and Minnesota. Income in the FIRE

industry appears to be concentrated in the major metropolitan areas, most notably New York, and is probably an outgrowth of consolidation among depository institutions and security brokers.

### **Summary**

Part III examined changes in Wisconsin's relative wage over the 1969 to 1999 period, and found that the decline in Wisconsin's wage has not been limited to a few industry groups, but rather has occurred in all major industry groups. The decline was most dramatic after 1978.

Relative wages in manufacturing have declined more than the state average and were examined in more detail because of their importance as base industries. From an industry perspective, declines in relative wages in the electrical machinery, instruments, and industrial machinery industries were identified as important factors in the decline in relative manufacturing wage rates. Faster growth in several lower-paying industries (lumber, furniture, printing, and plastics) also contributed significantly to the decline in the relative wage.

From an occupational perspective, two factors were identified as contributing to the decline in the relative wage. First, since 1985, Wisconsin has experienced a higher ratio of production workers to total workers than the national average. Since these jobs, on average, pay less than supervisory jobs, this tends to lower the relative wage. Second, the relative wage of supervisory workers in Wisconsin is less than the national average and is declining. A relatively low concentration of corporate headquarters in Wisconsin is a possible explanation for the lower supervisory wage rate.

Wisconsin's relative wage in the Finance, Insurance, and Real Estate industry group was also examined. Although Wisconsin's relative wage in this industry group has declined dramatically, this experience was not atypical, but rather a common occurrence among states, except for those with the largest metropolitan areas.

#### **IV. ANALYSIS OF PER CAPITA PERSONAL INCOME BY METROPOLITAN AND NON-METROPOLITAN AREAS**

##### **Introduction**

Part IV of the study investigates whether a distinction between metropolitan and non-metropolitan measures of per capita income might shed some light on the lower than average Wisconsin per capita personal income. The analysis examines the distribution of population between metro and non-metro areas in Wisconsin and the U.S., and the differences between metro and non-metro wages. Since previous results have indicated that relative wage rates in Wisconsin explain a large part of the observed per capita income gap, this section analyses the relationship between metropolitan area per capita income and population size.

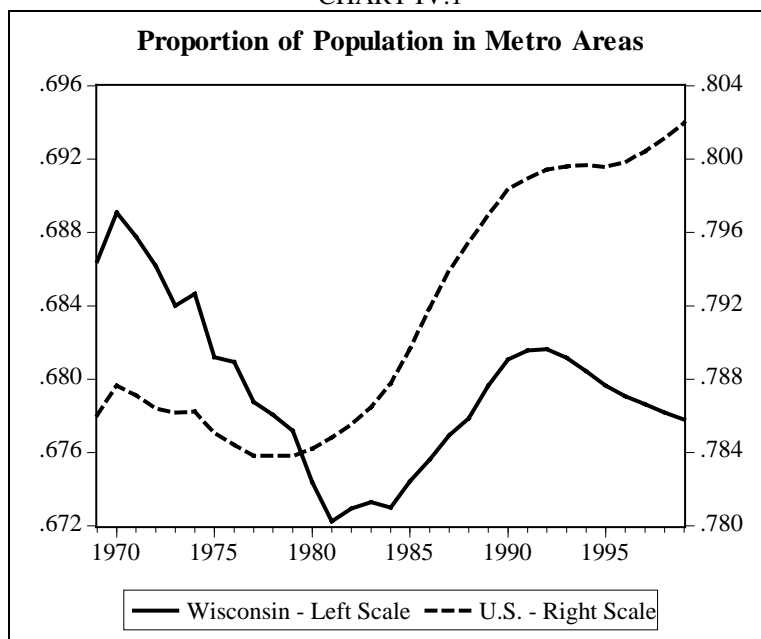
##### **Metropolitan and Non-Metropolitan Population and Employment**

Long-term economic growth and development has usually been associated with the migration of people from rural to urban areas. As productivity in agriculture increases and a pool of "surplus labor" emerges, more people become attracted to urban areas. Urban areas usually offer the prospects of higher incomes and the possibilities of more job opportunities due to greater industrialization and a greater variety of needed job skills. Census data shows that between 1810 and 1990, the percentage of rural population in the U.S. declined from 92.7% to 24.8%.

This study follows the metropolitan area definitions used by the Bureau of Economic Analysis (BEA) for its local area personal income estimates. Metropolitan areas are county-based definitions issued by the U.S. Office of Management and Budget (OMB) for federal statistical purposes. OMB's general concept of a metropolitan area is that of a geographic area consisting of a large population nucleus together with adjacent communities that has a high degree of economic and social integration with the nucleus.

Regions and states across the U.S. are not homogeneous in terms of the concentration of population and location of economic activities. In 1999, nearly 54 million Americans lived in non-metropolitan areas, and over 218 million lived in metro areas, over four times as many for metro areas as for non-metro areas. Wisconsin had nearly 1.7 million people living in non-metro areas in 1999, and a population of over 3.5 million in metro areas. The ratio of metro to non-metro population in Wisconsin is much smaller than the U.S., however, at 2.1 vs. 4.1. Over time, the proportion of metro population to total population has changed. The metro share of the total U.S. population was 78.6% in 1969, and climbed to 80.2% in 1999. In Wisconsin the metro share of population was more stable over the same period (68.6% in 1969 and 67.8% in 1999). In contrast to the national trend of an increasing metro share of total population, Wisconsin's share of population in metropolitan areas has declined throughout most of the period, except for the 1981 through 1992 period when it grew by over a percentage point (see Chart IV.1).

CHART IV.1



The share of wage and salary employment in metro areas followed the trend in the share of metro area population, declining in Wisconsin, during the 1969 to 1999 period, except for the mid-to-late 1980's. In 1969, the wage and salary employment in metro areas was 65.9% of total wage and salary employment in Wisconsin. It fell to 63.7% by 1999. By contrast, the U.S. metro share of wage and salary employment rose slightly from 80.0% in 1969 to 80.9% in 1999.

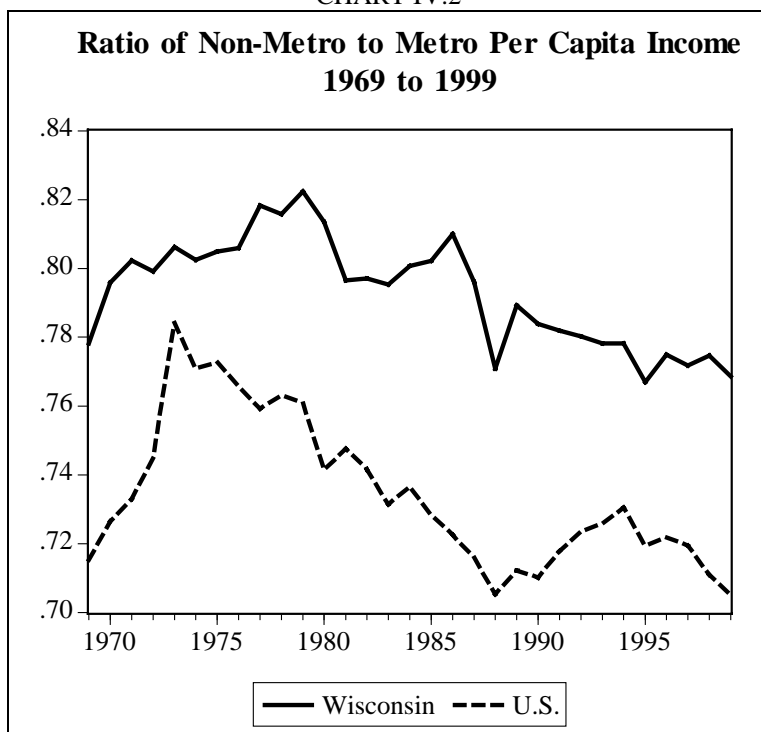
The trends in population and employment shares for metropolitan areas become important for the analysis of trends in per capita income for metropolitan and non-metropolitan areas, because wage and salary income is consistently the largest component of personal income.

### Metropolitan and Non-Metropolitan Per Capita Personal Income

Per capita income is lower in non-metropolitan areas than metropolitan areas in both Wisconsin and the U.S. (see Chart IV.2). In Wisconsin, per capita income in non-metropolitan areas has averaged about 79% of metropolitan area per capita income. In the U.S., per capita income in non-metropolitan areas has averaged about 73% of metropolitan area per capita income.

Another interesting fact to note from Chart IV.2 is that non-metro per capita income is closer to its metro counterpart in Wisconsin than in the U.S. In other words, the income disparity between metro and non-metro areas is lower in Wisconsin than in the U.S. As Chart IV.2 also shows, however, the disparity between metro and non-metro has tended to increase over time in both Wisconsin and the U.S.

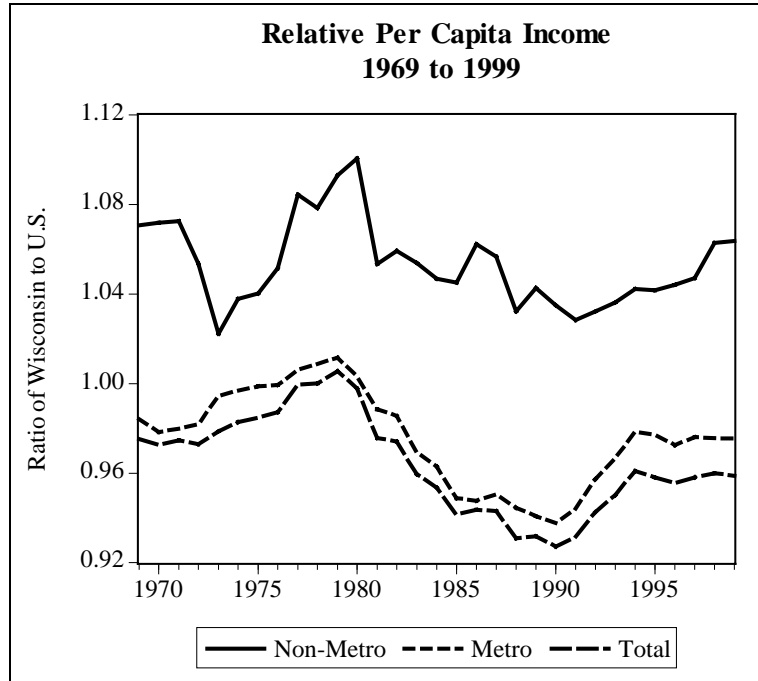
CHART IV.2



Wisconsin's (or any other state's) per capita personal income can be viewed as the weighted average of per capita income in metro and non-metro areas, with population serving as weights. Both of these components can then be compared to the analogous U.S. average. When per capita income is decomposed this way and the separate metro and non-metro components are shown, an interesting pattern emerges, as shown in Chart IV.3.

Wisconsin's non-metro per capita personal income has been above the U.S. average and has remained about 5% higher than U.S. non-metropolitan per capita income from 1969 to 1999. By contrast, Wisconsin's metropolitan per capita personal income has been consistently less than the U.S. average. Wisconsin total relative per capita income is highly correlated with Wisconsin metropolitan relative per capita personal income over time. This is because metropolitan per capita income has a weight of about 70% in computing the statewide average. Both of these income metrics, metro and total, increased and declined over time by about the same proportions. In 1969, metro and non-metro incomes stood at the level of 0.98 and 1.07 of their U.S. counterparts, respectively. By 1999, the relative income measures did not change significantly, measuring 0.97 and 1.06.

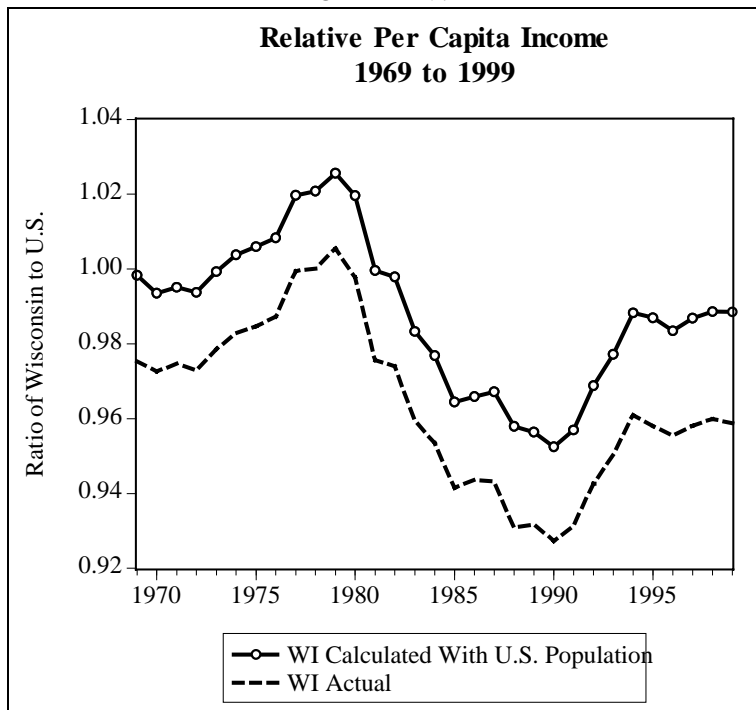
CHART IV.3



It should also be noted that because Wisconsin's population has been more concentrated in non-metro areas (32% in non-metro) compared to the U.S. (20% in non-metro), the ratio of Wisconsin to U.S. total relative per capita income is below both the non-metropolitan and metropolitan counterparts.

These facts suggest that the difference between Wisconsin per capita income and U.S. per capita income can be largely explained by Wisconsin's higher proportion of population living in non-metropolitan areas. Because the state per capita income is by definition the weighted average of metropolitan per capita income and non-metropolitan per capita income, it is possible to construct a hypothetical Wisconsin relative per capita income using U.S. metropolitan/non-metropolitan population weights and actual Wisconsin per capita incomes. Chart IV.4 contrasts this hypothetical relative to the actual Wisconsin relative. As expected, Chart IV.4 shows that with U.S. population weights, Wisconsin's per capita income would be much closer to the U.S. average. The hypothetical per capita income for Wisconsin is 2.4 percentage points (averaged over the 1969 to 1999 period) closer to the U.S. per capita income.

CHART IV.4

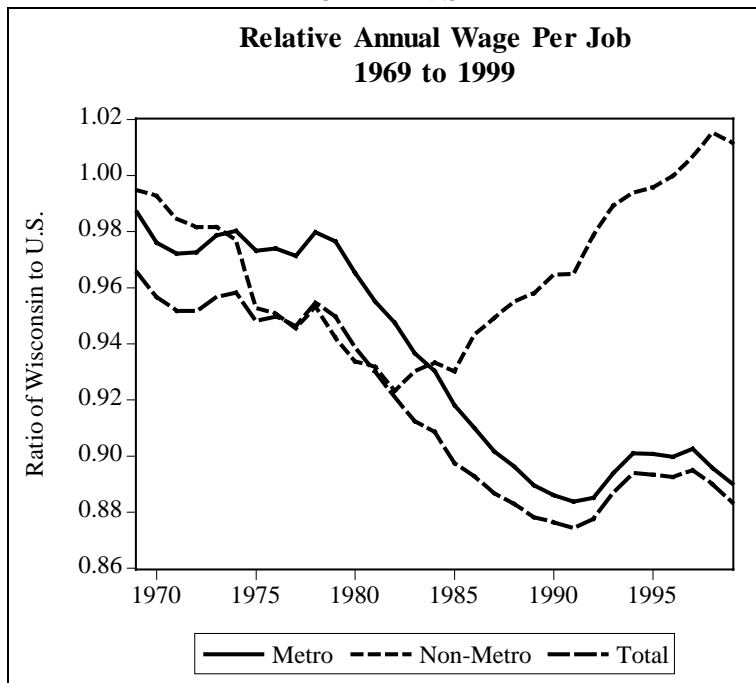


### Metropolitan and Non-Metropolitan Wages and Salaries

The next step in our analysis of metropolitan and non-metropolitan influences on per-capita income is to look more closely at the largest component of personal income – wages and salaries, reviewing the pattern of changes in metro and non-metro wages and salaries over the period 1969 to 1999. Chart IV.5 shows Wisconsin wage rates for metro and non-metro areas, relative to the U.S.

The trend in metro average wages has followed the trend in total state average wages. As Chart IV.5 shows, total wages per job and metro area wages per job have both continued to decline in Wisconsin relative to the U.S. On the other hand, non-metro average wages have exhibited a different pattern. Initially, between 1969 and 1980, non-metro area average wages followed the downward trend of the metro counterpart. Beginning in the early 1980's, however, Wisconsin's non-metro average wages relative to the U.S. began to rise—from 92% of the U.S. average in 1982 to over 101% of the U.S. average in 1999.

CHART IV.5



These increases in relative average wages in non-metro areas have not been sufficiently large, even with the growing share of non-metro employment, to compensate for a continuing decline in the relative average wage in metro areas. As a consequence, the Wisconsin total average wage per job relative to the U.S. continued to decline during the 1980's and into the 1990's, save for a small increase from 1992 to 1997.

### **Metropolitan Area Per Capita Income and Population Size**

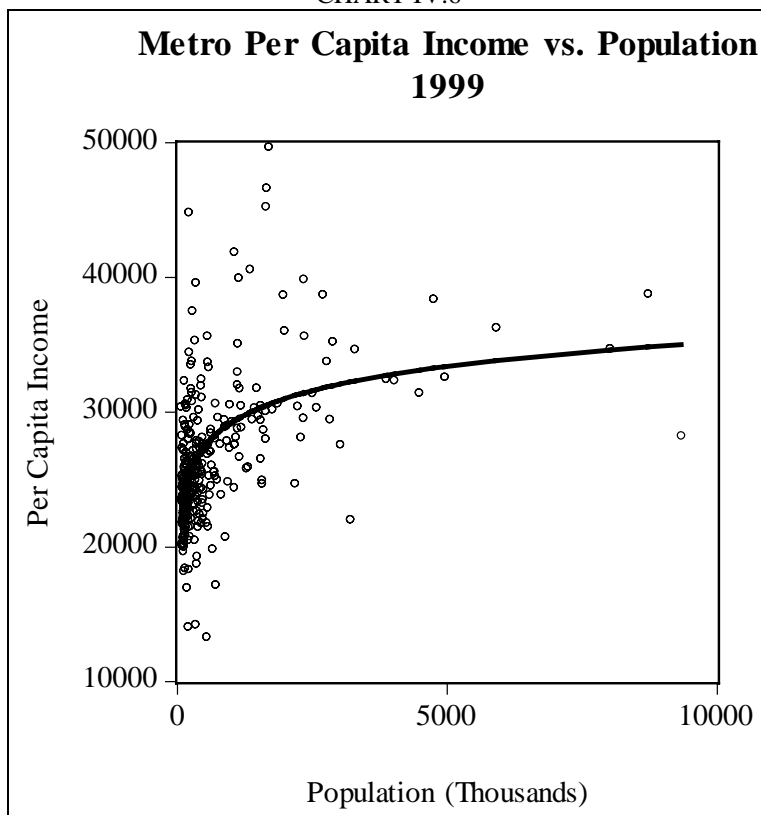
A final factor to consider in the analysis of metropolitan per capita income is population size. A comparison of the per capita income of all 318 metro areas in the U.S. with their population size shows that incomes rise with population.

In Chart IV.6, the relationship between per capita income and population in 1999 is shown as a scatter diagram with income plotted on the vertical scale and population plotted on the horizontal scale. Each dot represents a single metropolitan area. The line represents a simple least-squares regression fit between per capita income and the log of population, the latter capturing the non-linearity of the relationship. This relationship is also shown in Table IV.1.

TABLE IV.1  
REGRESSION OF METROPOLITAN AREA PER CAPITA PERSONAL  
INCOME ON POPULATION (1999)

Dependent Variable: Per Capita Personal Income - 1999				
Method: Least Squares				
Sample: 2 319				
Included observations: 318				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-6672.165	2917.157	-2.287215	0.0228
LOG (Population)	2597.985	227.8023	11.40456	0
R-squared	0.291581	Mean dependent var		26483.03
Adjusted R-squared	0.28934	S.D. dependent var		5097.387
S.E. of regression	4297.132	Akaike info criterion		19.57555
Sum squared resid	5.84E+09	Schwarz criterion		19.59921
Log likelihood	-3110.513	F-statistic		130.064
Durbin-Watson stat	1.705868	Prob (F-statistic)		0

CHART IV.6



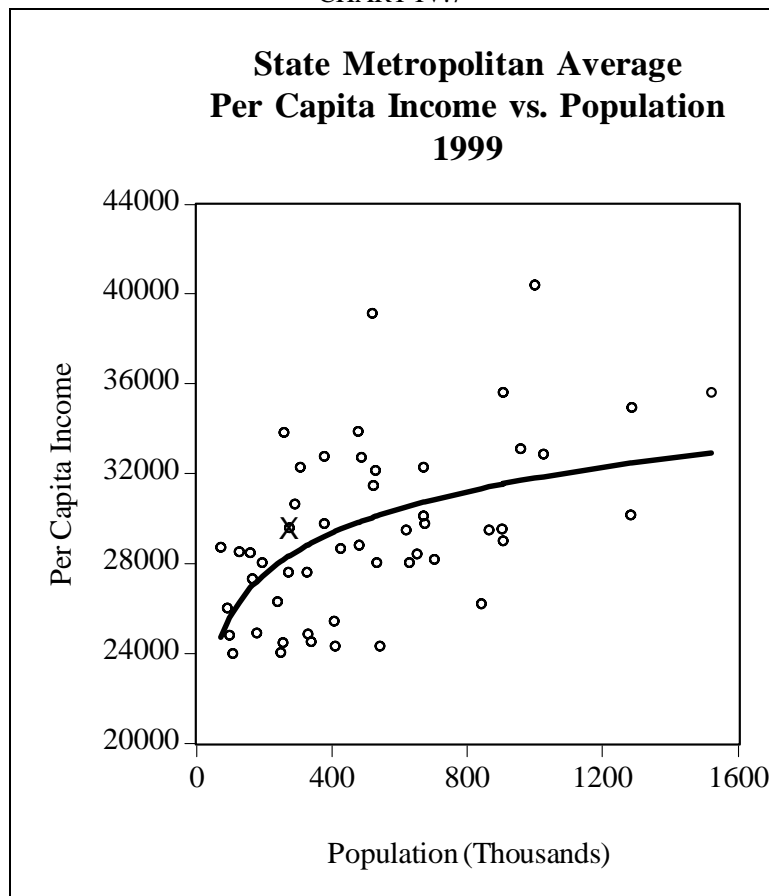
The fitted line has a positive slope through the entire population range. At smaller population sizes, per capita incomes rise rapidly, and at larger population sizes incomes rise less rapidly, but rise none the less. This result is also true for the years 1969, 1979, and 1989, implying that metropolitan per capita income rises with population for all years.

How does Wisconsin fit into this picture? With eleven metro areas within the state and three additional counties attached to two Minnesota metro areas, Wisconsin is characterized as a state with many small metropolitan areas and only one large metro area. Even the Milwaukee-Waukesha Primary Metropolitan Statistical Area (PMSA), while the largest in Wisconsin, does not rank among the 30 top population centers of the U.S. With so many metro areas to compare, however, it is difficult to visually place Wisconsin on the scatter diagram of Chart IV.6. Wisconsin metro areas can be better placed in the context of U.S. metro areas by condensing the observations to the averages of the fifty states and the District of Columbia. This is done in Chart IV.7.

Chart IV.7 again shows the relationship between per capita income of metro areas and the population size of metro areas, but now there are only fifty-one observations. The measure of average metro per capita income for the each of fifty states is total personal income of metro areas in that state divided by the total population of those metro areas. The measure of average metro population size in each state is the total population of metro areas in that state divided by the number of metro areas. By depicting an average metro area for each state we gloss over a wide degree of within-state variance, but gain the advantage of placing Wisconsin within the context of all other states.

Wisconsin is represented by the dot with an X superimposed on it. With an average metro per capita income of \$29,575 and an average metro size of 273,749, Wisconsin is slightly above the least-squares fitted line. That is, for a given population, the per capita income of Wisconsin metro areas is above what would be expected based solely on the relationship between population size and per capita income of all fifty states. This also holds true for each metro area in Wisconsin considered individually. The actual per capita incomes of all Wisconsin metro areas are above the expected values for per capita income based on actual population and the fitted relationship shown for all 318 metro areas.

CHART IV.7



There are, of course, other factors that contribute to the size of metropolitan per capita income. We need to consider these factors in addition to population size to determine if the relationship between population size and per capita income is robust. That is, when we include additional factors to explain the variation in metropolitan per capita income, does population size still remain a significant positive factor?

We would expect that industrial concentration of high wage jobs, concentration of property income, educational attainment, racial composition of the population, and population density to also partly explain the variation of per capita income across metropolitan areas. Table IV.2 shows the results of adding these variables to the regression of Table IV.1.

As a result of seven additional control variables, the explained variation in metropolitan per capita income rises from 29% to 67%. All additional variables have the expected sign, although the percent of the population that is African-American and the population density are not statistically significant. The important conclusion that population size matters still holds, however. Even after accounting for a host of factors to explain the variation in per capita income across metropolitan areas, there is a strong tendency for incomes to increase with population.

This finding is significant for any discussion of how Wisconsin may wish to address the per capita income gap vis-a-vis the U.S. There may be a set of agreed-upon and sensible development policies to address the perceived problem of Wisconsin's low per capita income (i.e., low relative to the U.S. average). In the end, however, there may be a portion of the income gap that is attributable to the general characteristics of Wisconsin metro areas, and that is not readily amenable to policy initiatives. For example, do we wish to espouse a policy to develop large, densely populated urban areas to narrow the per capita income gap, when there may be a general satisfaction with life in small towns and medium sized cities? This analysis suggests that changing metro size may be a part of the policy mix for addressing the income gap, but this analysis also remains mute on the cost of doing so.

TABLE IV.2  
REGRESSION OF METROPOLITAN AREA PER CAPITA PERSONAL INCOME ON POPULATION,  
DEMOGRAPHIC AND ECONOMIC VARIABLES

Dependent Variable: Per Capita Personal Income - 1999				
Method: Least Squares				
Sample (adjusted): 2 318				
Included observations: 296				
Excluded observations: 21 after adjusting endpoints				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	-12557.08	2626.769	-4.780429	0.0000
LOG (Population)	1764.448	198.3549	8.895414	0.0000
Per Cent Earnings - FIRE	29305.09	6573.133	4.458314	0.0000
Per Cent Earnings - Property Income	32674.19	4654.280	7.020245	0.0000
Per Cent Earnings - MFG	10301.14	2154.059	4.782199	0.0000
Per Cent Hispanic 1996	-55.1867	14.46808	-3.814375	0.0002
Per Cent African American 1996	-28.50634	18.79689	-1.516545	0.1305
Education of B.A. or More (1990)	358.4883	31.94512	11.22200	0.0000
Population Density	1.414951	0.617014	2.293223	0.0226
R-squared	0.670250	Mean dependent var		26613.88
Adjusted R-squared	0.661058	S.D. dependent var		5119.476
S.E. of regression	2980.492	Akaike info criterion		18.86750
Sum squared resid	2.55E+09	Schwarz criterion		18.97970
Log likelihood	-2783.390	F-statistic		72.91954
Durbin-Watson stat	1.930665	Prob (F-statistic)		0.000000

## Summary

In Part IV, Wisconsin's relative per capita income was analyzed through the lens of geography, by dividing states into metropolitan and non-metropolitan areas. In contrast to a long-term national trend of an increasing metropolitan area share of total population, Wisconsin's share of population in metropolitan areas has declined from 1969 to 1999, except for the 1981 through 1992 period. The metro share of Wisconsin population fell from almost 70% in 1969 to 67.7% in 1999. This trend of an increasing share of non-metro population was paralleled by a trend of an increasing non-metro share of wage and salary employment. Specifically, the share of employment in non-metro areas continued to grow between 1969 and 1999, except for the mid-to-late 1980's. Wisconsin has more population and employment living in non-metro areas than the U.S. average. If Wisconsin's metro/non-metro population proportions would have equaled those of the U.S., Wisconsin's per capita income would have been 2.4 percentage points closer to the U.S. average.

In addition, although relative wage rates have been rising in Wisconsin's non-metro areas for the past 20 years, and are now above the U.S. average for non-metro areas, the gain in non-metro wage rates has not been enough to counter the continued downward trend in metropolitan wage rates in Wisconsin.

The analysis also found that per capita income in metropolitan areas is strongly associated with population size. Wisconsin's metro areas are mostly small in population size, and that fact explains a significant part of the Wisconsin-U.S. per capita income gap.

## ENDNOTES

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<sup>1</sup> The Wisconsin Expenditure Commission, "Final Report" (1986).

<sup>2</sup> 2001 Assembly Bill 1, 2001-2002 Legislature, State of Wisconsin (2001).

<sup>3</sup> Todd A. Berry, "Ensuring Growth: Perspectives on Fiscal Readiness," University of Wisconsin Economic Summit, November 29- December 1, 2000, Wisconsin Taxpayers Alliance (2000). See for example Robert J. Barro and Xavier Sala-i-Martin, *Economic Growth*, MIT Press (1998).

<sup>4</sup> Paul Romer, "Increasing Returns on Long Run Growth," *Journal of Political Economy* 94 (1986).

<sup>5</sup> See for example Richard M. Easterlin, "State Income Estimates," in *Population Redistribution and Economic Growth: United States, 1870-1950*, Vol.1, The American Philosophical Society (1967).

<sup>6</sup> Kim Sukko, "Regions, Resources and Comparative Geography: Sources of U.S. Regional Comparative Advantage, 1880-1987," *Regional Science and Urban Economics* 29 (1999).

<sup>7</sup> Kris Mitchener and Ian W. McLean, "U.S. Regional Growth and Convergence, 1880-1980," *The Journal of Economic History* 59 (1999), and Saurav Dev Bhatta and Jose Lobo, "Human Capital and Per Capita Product – A Comparison of U.S. States," *Papers in Regional Science* 79 (2000).

<sup>8</sup> Daniel H. Garnick and Howard L. Friedenberg, "Accounting for Differences in Per Capita Personal Income Growth, 1929-79," *Survey of Current Business* (September 1982), and Andrew G. Bernat and Eric S. Repice, "Industrial Composition of State Earnings," *Survey of Current Business* (February 2000).

<sup>9</sup> Robert J. Barro and Xavier Sala-i-Martin, "Economic Growth and Convergence Across the United States", Working Paper No. 3419, National Bureau of Economic Research (August 1990).

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